# Nintendo-64 Joystick on the PC

## An update for the latest games

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A number of readers kindly informed us that not all new games released for the PC work smoothly with the software we supplied for the 'PC Interface for Nintendo Joystick' project published in the February 2000 issue. The software update described here solves the main problem of jerky movements (or none at all).

| | |
|---|---|
| 100% incremental control | L button and C button Up (default) |
| 66% incremental control | L button and C button Right |
| 33% incremental control | L button and C button Down |
| A-B exchange | L button and C button Left |

Correct operation of the Nintendo-64 joystick in combination with PC games is dependent on the synchronisation of the microcontroller with the rate of the scanning pulses that appear at the PC's joystick port. In order to start timely, the two instructions `jnb JOYAX, *` and `jnb JOYAY,*` are essential in the main loop. The previous version of the software only monitored the JOYAX signal, which caused timing routines to be started too early resulting in slightly jerky movements on the screen (for example, of a crosswire or a game character). In relation to the same problem, the two delays `jb JOYAX,*` and `jb JOYAY,*` have been inserted to get a better defined flag when the scanning routine starts. Once the start of a scanning routing has been positively identified, the joystick lines JOYAX, JOYAY, JOYBX and JOYBY are made logic Low. This prevents the charging of the capacitor networks inside the PC. Next, the program executes the routine **`servicetime`** which interrogates the Nintendo-64 controller, calculates the values for Joystick A and Joystick B and, finally, copies the status of the joystick button to the PC. As opposed to the old software, the measured analogue values are directly processed as 8-bit values rather than converted into signed 16-bit values (which is time consuming). The accuracy is not affected because only 8-bit values are available from the controller. To make sure that the service routine has a uniform length, a timer is arranged to run in parallel with it, and the timer's timeout flag is monitored once the service routine is finished.

In the next subroutine, called **`joytime`**, the individual joyport lines are successively made logic High depending on the joystick position. The timing capacitors in the monostable multivibrators contained in the PC's joystick interface are then allowed to charge, resulting in 'fake' analogue resistance values. Because **`joytime`** is reduced to a simple wait loop without interrupts, the 16-bit conversion has been removed. Another change is the small delay after **`joytime`**, which allows the capacitor networks to charge completely.

When the new software is used, the controller needs to be software-calibrated again. How this is done is explained in the February 2000 article, which also discusses the operation of the circuit and the PC game port.

Another change affects the three-stage incremental control. In order to set the incremental rate of the control stick, it is no longer sufficient to press the L key on the controller. A new feature is the option to interchange the analogue unit and the control stick in software. This however requires a re-calibration of the joystick. The button allocation is not affected by the swap action.

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**For switchover the following sequence is required:**

1. keep L button pressed
2. keep desired C button pressed
3. Release L button
4. release C button

**Sequence during scan cycle:**

| PC joystick lines | N64_2_PC joystick lines |
|---|---|
| High: from previous cycle | waits for Low |
| Low: discharge capacitors | waits for High |
| High: charge capacitors | Low: prevent capacitors charging |
| Measure charging time | Service time 250 µs, fetch values from controller, process, output switch status |
| Measure charging time | joytime approx. 10-1285 µs, then pull all lines High and start charging capacitors |
| Measure charging time | Consolidation time approx. 20 µs |
| Process measured times | |

## Free Downloads

Updated microcontroller software.
File number: **020288-11.zip**
www.elektor-electronics.co.uk/dl/dl.htm, select month of publication.